Colony of Seychelles.

ANNUAL REPORT

ON

AGRICULTURE AND CROWN LANDS

FOR THE

YEAR 1918.

Published by Command of His Excellency the Governor.

VICTORIA.

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Calendar of Observations

ANNUAL REPORT

OF THE

SECRETARY AND TREASURER

FOR THE

YEAR 1916.

VICTORIA.
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1916.

AGRICULTURE AND CROWN LANDS

ANNUAL REPORT FOR 1918.

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CHAPTER I.

EXPENDITURE, RECEIPT, SALE OF PRODUCE &c.

	Rs	c.
Sale of produce	1,617	25
Royalty on guano	609	99
Export duty on guano	2,470	...
Rent of Crown Lands	17,810	...

Exclusive of buildings.

The total expenditure of Agricultural and Crown Lands amounts to Rs 11,514.73.
The principal plants sold were the following :

Coffea robusta
Eloeis guineensis (Palm Oil)
Trachylobium verrucosum (Copal gum tree)
Ipomea batatas (sweet potatoes)
Casuarina equisetifolia (cedar tree)
Musa Paradisiaca (bananas)
Eucalyptus gigantea and alba
Hibiscus rosa sinensis local hybrids
Bougainvillea lateritia
Lagerstroemia indica white
Araucaria excelsa
Heliconia aureostriata
Beaumontia grandiflora

Among the plants successfully introduced during the year, the following may be mentioned :

Zizyphus jujuba from Egypt
Galphimia brasiliensis from Egypt
Feijoa Sellowiana ,,
Terminalia belerica ,,
Hyphoene thebaica ,,
Eupatorium uparium ,,
Solanum verbasifolium ,,
Persica vulgaris ,,
Bouea macrophylla — Java
Coffea robusta ,,
Eugenia malaccensis ,,
Eloeis guineensis from Nigeria
Lucuma salicifolia from Mexico

Among economic palms which received the attention of the department during the year mention is made of the Areca nut (Areca catechu) which fruited uncommonly well at Government House where the sides of a path were planted with the best Malayan varieties of these trees in 1903. No crop had been obtained before owing to attack of scale insects from which the trees were relieved in 1917. As many as 3000 seedlings were raised and set out on various Crown lands at different elevations. A few trees produced more than 5 lbs of dry nuts during the year. Owing to the war the value of the kernels of these nuts rose to 40 cents a lb in Seychelles. There are enough betel and areca nut chewers among the Indian population to warrant such a productive palm being propagated.

CHAPTER II.

STRIKING SPECIES WHICH FLOWERED OR FRUITED FOR THE FIRST TIME.

1. Palm oil seeds of the soft kernelled varieties were received from the Director of Agriculture S. Nigeria during the year (December). Two parcel posts reached Seychelles after being exactly 4 months in transit. Upon the recommendation of Sir D. Prain small consignments will be tested at first as regards the germinating power of the seeds before larger consignments are secured.

The varieties already established in the colony continue to do well. The 8 trees grown at the Botanic Station in poor laterite and obtained from soft shelled seeds from the Cameroons in 1912 have all flowered. Ripe nuts were obtained from 4 trees Nos. 1, 3, 4, 5. Of these trees 2 turned true to type Nos. 3 and 5. Nos. 1 and 4 produced hard shelled nuts. At the "Palms" (private estate) out of 7 plants of the soft shelled variety grown in good alluvial soil 4 fruited during the year, Nos. 2, 4, 6, and 12. Of these only 1 produced nuts true to

type No. 6. It is a fine tree which fruited abundantly this year, 4 ripe bunches having been secured in November and December. The proportion of kernel o/o nuts (dry) is as high as 53. In the hard shelled types the proportion is 13 o/o. In another field set out in 1915 near the hospital bridge there are at present 13 palms growing in two rows out of which 11 are just coming into bearing and it remains to be seen early in 1919 how many of these plants from soft shelled seeds will come true to type. The fruits of palm oil trees are already so much appreciated by school boys and others that it is very difficult to secure ripe nuts. As soon as a bunch of fruits is full grown pilfering invariably takes place and it is only possible to get a small percentage of ripe nuts, if any. I am indebted to the proprietor of the "Palms" who in 1918 allowed me to fence in tree No. 6 from which seeds are now being secured and sown. It has been decided on Government land to remove the trees which produce hard shelled nuts so as to avoid cross polination of the more valuable soft shelled plants. It is however as yet too early to adopt a general policy as regards this question of selection because many of the hard shelled trees grown from soft shelled seeds seem to produce hitherto larger bunches of fruits yielding larger kernels and more pericarp than the true to type trees. For this reason the whole row of trees at the "Palms" will be left standing although more than half of them have already been shown to produce hard shelled nuts. The plants grown from seeds obtained from Lagos in 1913 have not yet come into bearing.

Algaroba (Prosopis juliflora). This tree introduced last year flowered at the age of 2 years but produced only 1 ripe pod in Victoria. The climate of the low country districts seems to be too warm for this plant which is badly attacked by the mealy bug (Icerya Seychellarum). It will be tried at higher elevations this year.

Flacourtia Cataphracta.—This is a shrub producing edible berries called prunes in Mauritius from which Colony it was introduced 2 years ago. The plants fruited well at the Botanic Station although it is badly attacked by the scale Asterolecanium pustulans. Another species of Flacourtia introduced from Java under the name Flacourtia ruken also fruited this year. Both these plants produce plums which are larger than the local type which is Flacourtia Ramontchi.

Carissa Carandas.—This shrub introduce from India in 1917 flowered for the first time this year. It has not yet produced its fruits which are more beautiful than good flavoured although they make pleasant jams.

Mascarenhasia elastica.—This rubber tree from Madagascar introduced in 1912 produced ripe fruits this year. The seeds have been sown. This tree grows well in the poor laterite soil of the Botanic Station and is remarkably free from blight. Many plants indigenous to the Mascarene islands flourish in Seychelles better than other foreign plants which are more susceptible to disease showing that they are not so easily acclimatized. There are however many exceptions to this rule.

CHAPTER III.

Distribution of Information on Agricultural Matters.

All available information is at present submitted to the Council of the Planters' Association of which the Curator is an ex-officio member. The rules and regulations of the Association are being modified in order to legalise the publication of an agricultural bulletin which is about to be started. By this way all information on agricultural matters will be made public. The bulletin will be edited by the Council of the Association. The Association will thus be rendered more popular and although it does not embody all the planters of the Colony those that belong to it control more than 2/3rds of the land under cultivation. It is very difficult in a small colony to cause all the planters to combine but already the services rendered by the Association in defending the interests of the community are so great that the planters who still keep aloof will gradually join in. The Chairman of the Association was appointed member of the Legislative Council during the year and one may say that the position of the Planters of the Colony has been considerably strengthened in 1918.

CHAPTER IV.

Meteorological Observations.

The following table shows that the rainfall for the year under review was much below the average and it is to be presumed that the crop of coconut which is so much dependent on the rainfall must have been considerably reduced. The rainfall from June to June is also recorded and shows clearly that the shortage was 21 inches as compared with the corresponding period for the year before and as much as 39.95 inches as compared with the average for the last 21 years. The months of January, February and March 1917 were very dry while they are on the contrary very wet in normal years. At this time of the year corresponds with a period of greater vegetative activity as regards coconut that is to say it is the time of the year during which the palms put on more growth and as the nuts take 12 months to mature it is to be feared that the draught of 1917 has upset the crop for 1918 more than it is generally believed. The season which governed the crop of vanilla for 1918 was too wet as recorded last year and that which governs the crop for 1919 has on the contrary been too dry (June, July, August 1917). The crop for 1920 will also be lost as a rainfall of 14.25 inches has been recorded for August 1918. This month should have been very dry as usual. The figures given for the crop of vanilla in a given year corresponds with the flowering which took place 2 years before as vanilla flowers in September—December in a given year but takes 9 months to come to maturity, and about 7 or 8 months to be cured and exported.

Meteorological Observations

Temperature			Hygrometer			Rainfall		Rainfall from June to June.			
Daily average per mensem	Maximum	Minimum	Wet Bulb	Dry Bulb	Humidity	Total monthly	No. of rainy dys	Months	1915–16	1916–17	1917–18
January	80.2	75.7	74.9	78.4	53	24.18	19	June	4.29	1.04	1.41
February	82.6	76.5	76.6	81.8	55	4.64	8	July	5.63	4.29	1.74
March	83.8	77.6	77.0	83.3	59	2.33	6	August	0.50	2.23	14.25
April	84.7	78.5	77.4	83.9	63	2.34	4	September	0.50	0.10	9.14
May	83.4	79.0	76.9	83.2	70	2.92	7	October	1.13	6.89	8.92
June	81.0	77.2	74.6	80.6	69	0.95	7	November	4.40	12.77	9.95
July	80.2	75.6	73.4	79.4	70	1.41	9	December	10.18	24.18	
August	79.9	75.5	73.3	78.9	70	1.74	12	January	22.93	4.64	
September	81.2	77.2	75.7	80.3	68	14.25	23	February	20.04	2.33	
October	82.1	77.0	80.6	81.2	62	9.14	10	March	3.61	2.34	
November	83.3	74.4	76.8	82.3	60	8.92	8	April	12.76	2.92	
December	82.3	76.3	76.8	81.6	61	9.95	14	May	0.10	0.95	
	82.0	76.7	76.1	81.2	63	82.77	127		86.07	64.68	

CHAPTER V.

THE COCONUT INDUSTRY.

	1915	1916	1917	1918
Nuts exported in nature... ...	200,673	93,959	106,775	123,285
„ converted into coprah ...	20,439,356	18,573,844	14,795,550	4,545,212
„ „ oil... ...	674,568	575,179	561,192	2,447,200
„ „ soap ...	445,445	437,983	195,640	10,690
„ consumed locally	4,000,000	4,000,000	4,000,000	4,000,000
Total ...	25,760,042	23,680,965	19,659,157	11,126,687

The above custom returns show the quantity of coprah, oil, soap and the number of nuts exported during the year under review. Owing to shortage of freight a large quantity was left unexported at the end of the year. No figure is therefore available to show the production of nuts during 1918.

According to private returns from a few leading estates, the production left much to be desired. The rainfall was deficient especially in the outlying and in the Praslin group of islands but in my mind the great factor which reduced the crop was disease consequent on exhaustion of the soil. Manuring is gradually being taken up but eradication of disease is not carried out properly from want of sufficient attention being paid to plant sanitation. It is not difficult to point out diseased trees by close examination on a given estate but from a distance this is not possible except by an expert. So long as a trained man will not be permanently attached to the work of eradicating the melitomma and the stem bleeding diseases, coconut palms will be handicapped and will never produce large crops in spite of heavy manuring. It is useless to manure a tree which is about to succumb to disease. It is well known that over 50 o/o of the trees are diseased and not treated in any way. It is no wonder that a large number of them remain unproductive or produce only half a dozen nuts during the year instead of 30 or 40.

The two above diseases referred to have often been described in the reports of this Department. Another disease referred to as little leaf disease in my last annual report is gaining ground. Diseased specimens in various stages were sent to Dr Petch of Ceylon during the year for identification. This disease is still sporadic but it might become epidemic if no measures of eradication are taken. The symptons of the disease have been described in a leaflet for the information of planters. The coconut, as well as 4 indigenous palms out of 5, are attacked and the symptoms are those that have already been described in Trinidad and Jamaica under the name of Hard or Little leaf' Bitten disease and in the East as leaf break disease. The leaves remain dwarfed or stunted and the ends wither up giving the tree the appearance of having lost its heart, and resembling an advanced stage of bud rot. If this condition is present on all the leaves of the tree the new leaves that are formed seemed to be held back and if they make their appearance they are dwarfed and twisted. When one whorl only of the leaves is attacked the trees recover but when all the young leaves are involved the case is fatal. These twisted leaves show long, raised, brown, hard patches on the upper surface. The diseased leaves should be removed when the tree is partially attacked and the whole crown cut down, chopped and burnt when the case is fatal. Knives used in chopping the soft parts of the tree should be disinfected after treatment and the wounds dressed with Bordeaux mixture. I have in a few cases observed a few other symptoms such as the leaves becoming striped as if bands of chlorophyll had disappeared and the strainers and bottom end of the stalk becoming soft and putrid. The latter symptoms are those that occur in the bud rot disease which is so common all over the world. The bad sanitary conditions in which the coconuts plantations of this colony are such that the above diseases are decidedly on the increase. Steps are being taken towards compulsory legislation as this is perhaps the only means of showing to all concerned the proper way of treating the diseases. I do not know what would happen if the coconut industry, which is the staple of this colony, were to suffer from an epidemic form of coconut disease instead of the sporadic form at present prevailing. This justifies drastic measures being adopted. A coconut tree is by nature an ideal medium for disease of all sorts. Many organisms are bound to be deposited and to develop on its soft tissues so easily torn or bitten off by insects and especially in the axils of the sheathing leaves between which vegetable debris of all sorts accumulate.

CHAPTER VI.

Experiment on the Manuring of Coconut at Long Island.

No. of plot	Manure used.	No. of trees per plot.	Crop during the year, nuts per tree.
1	no manure or control	12	8
2	green manuring	17	12
3	same as 2 + guano (800 lbs per acre) ...	20	16
4	same as 3 + ash (800 lbs per acre ...	14	22
5	same as 4 + lime 1,270 lbs per acre ...	12	19
6	fish guano 600 lbs, fresh sea weeds 2¾ tons...	15	23
7	no manure or control	11	19
8	same as 2	17	19
9	same as 3	17	17
10	same as 4	10	12
11	same as 5	16	20
12	same as 6	21	11
13	no manure or control	12	6

As it was found impossible to import sulphate of potash and fish manure from abroad, spoiled salt fish from the outlying islands purchased at Rs 5 per 100 lbs, and ash made from burnt leaves and husks were used instead. As stated last year it was found necessary to build walls to prevent erosion in the experimental plots which are sloping considerably. 2012 C. feet of wall were built during the year. The results are so far promising and already the good effects of the manures are shown by the appearance of the trees. The trailing herbaceous plant which was set out in 1917 (Asystasia coromandeliana) in order to help in preventing erosion pending the completion of the walls have done well. This weed is hoed in as green manure together with the cowpeas. The latter plant which refused to grow except in the lime plot is doing as well now in the plots where ash and guano are used as manure. The calciphilous nature of this leguminous weed is thus well illustrated since lime is also found abundantly in ash and guano.

A glance at the above tabulated returns shows that the soil in the experimental plot is not the same from one end of the field to the other. The yield is good from No. 1 to No. 9 and then decreases considerably from No. 10 to No. 13. It is for this reason that 3 control plots were established at the commencement of the experiment, one at both ends and one in the middle. Hitherto the best result has been obtained with fish guano and seaweeds. The number of nuts in plot 6 exceeds the yield of the average control plots by 14 nuts per tree and is greater than the natural yield of the same plot by 7 nuts. If a comparison be made between plots Nos. 3, 4 and 5, it will be seen again that ash and guano have a beneficial influence equal to that of guano, ash and lime. This tends to show that lime which exists in the guano as phosphate of lime and in the ash is sufficient to supply the requirements of the plot in lime as far as manuring is concerned. This element (lime) has however a peculiar effect in promoting at once and more readily than guano the growth of leguminucus plants and is likely to show after effects by liberating fertilising elements (nitrogen and potash) from the soil. These after effects will be closely followed in subsequent years in the plots which will continue to receive the same treatment. One should not be surprised that potash is singularly active in soils of Mahé and that coconuts suffer from a famine of potash. Ash from coconut husks contain about 50 o/o of potash and as this potash contained in the husks has been removed from the soil for centuries, a simple addition of ash or seaweed scontaining potash is for the present more immediately beneficial than most manures, especially when nitrogen is added in the form of fish guano.

It is to be hoped that these experiments will be duplicated in Mahé in fields which are less exposed to erosion. If a piece of ground is given by some enterprising planter I would recommend one that is very free from disease as at Long Island in order to avoid a disturbing factor (disease) which may be worse than that which is consequent on erosion. An experiment is ruined if out of 20 or 25 trees per plot, 4 or 5 trees succumb to disease. It is also to be recommended that a strip of land between each plot should be left unmanured as control in order to avoid the roots of the manured trees taking nourishment from the adjoining plot manured in a different way.

CHAPTER VII.

THE VANILLA INDUSTRY.

For the last 6 years no large vanilla crop has been obtained in the Colony. Even before that time, and as far back as 1907, vanilla crops were produced at intervals of several years and the industry began to decline rapidly. This falling off is due to the orchid having been grown for over 50 years in the same soil without manuring and to its being reproduced from cuttings all the time. Nurseries in which vanilla is grown from seeds would render the vines more vigorous. When the food elements that are necessary to the growth of the orchid had been exhausted vanilla becomes diseased. A fungus, Calospora Vanillae, was found as far back as 1892 and since then it gradually spread over the whole archipelago. There are a few spots where here and there good vanilla is still to be found but when one travels alongside the roads in Mahé and Praslin one no longer sees those large flourishing vanilla plantations which were scattered out in all localities. They have gradually disappeared, undermined by disease and drought. Even the best plantations that looked so promising in 1910 and 1911 on many leading estates succumbed to disease 2 or 3 years after and since then very few planters still continue to grow vanilla. The crop for 1918 amounted to 28,000 lbs and was considered as a good one. In the 90's good crop used to reach 70,000 lbs.

The experiments on the manuring of vanilla were interrupted during the year from want of copper sulphate for the treatment of the disease and of the necessary ingredients for the manuring which were unobtainable during the war. They will be resumed as soon as the chemicals will be available. In the meanwhile many vines which were not sprayed with Bordeaux mixture became attacked by the disease and the loss sustained in many of these plots will go far to upset the future of the experiments.

Manuring with seaweed, coconut husks, coral sand, horse manure, fish guano still continues in plots 2 years old and the results hitherto obtained show that all organic manures of slow decomposition seem to be beneficial and that coral sand by preventing the soil from hardening is a useful adjunct in lateritic ground. The results will be tabulated as soon as the production of pods will permit a comparison of the crops in the different plots.

With regard to manuring with chemical fertilizers in solutions of 50 to 100 grs in 10 litres of water, there is no doubt that nitrate of Ammonia is to be recommended but the experiments in my opinion should be made on other lines to become conclusive. The plots, as stated last year, should all consist of cemented basins into which the roots of the shade trees should not interfere and rob the vanilla of part of the manure which is experimented with. Under the influence of manure the formation of an extra number of rootlets of the shade trees in the basins themselves causes the soil to become root bound and goes far to check the growth of vanilla and this process becomes the more accentuated the more manure is spread.

in the plots. A substance which is a manure to the orchid is unfortunately also a manure to the shade tree. For this reason manurial experiments with vanilla should be made in those roughly built conservatories used in the tropics for the culture of orchids or ferns and in which high masonry pillars support treillis work on the sides and lattes or coir matting loosely woven on top. This should be the only means with which to dispense with shade trees and to cause a proper treatment of the disease besides being a way of sheltering vanilla from wind and drought so as to render the plots of uniform and homogenous growth.

CHAPTER VIII.

THE RUBBER INDUSTRY.

Rubber was exported to the amount of 650 kilogs only as compared with kilogs 3923 or 6 times more the year before. In 1915 only 285 kilogs were exported. The falling off in the amount exported as compared with 1918 is due to many planters having given up tapping from fear of not being able to export the manufactured article through lack of shipping. For the same reason there is a lot of rubber manufactured in 1918 which will be shipped in 1919 as soon as freight facilities will be restored. I know one planter who manages a group of estates who will himself produce several tons during 1919. Many large rubber estates have not yet started tapping from want of the necessary appliances unobtainable during the war.

No greater mistake have ever been made by the Seychelles planters than the delay in taking up rubber planting. As far back as 1902 seeds and all other facilities for planting were given to them, but partly through ignorance and partly through wrong advice given to them by leading men who pretended to know, planting was very slow at the beginning. There are about 1500 acres under rubber at present, whereas there should be more than 4000 acres producing about one million rupees net profit. This would have changed the whole position of the planters who at present are suffering from great difficulties.

I remember that 15 years ago the principal objection to growing rubber in Seychelles was that the natural product would never compete with the synthetic article. 15 years have elapsed and there is still no artificial substitute on the market. But the bogey of synthetic rubber was dear to some leading members of the community who went far to advise wrongly the conservative planters of this colony. Fortunately this feeling stands no longer in the way of rubber planting which is rapidly progressing.

The rubber outlook is far better than it ever was. Even a boom is contemplated if the industry is not put under Government control. The plantation industry has reached the formidable production of 250,000 tons a year. But this amount is readily absorbed, America alone purchasing nearly 150,000 tons. Synthetic rubber is not a commercial possibility. There will be a great expansion in industry once the problems of reconstruction after the war are solved. The price at the end of 1918 was on an average quite as good as in 1917 and 1916. Trade restrictions are now abolished. The consumption in America is 4 lbs per head of inhabitant while it is still 1/4 lb in England and 1 lb in France, not to speak of other countries where it is still lower. China and India, which represent nearly a quarter of the population of the world, are practically non-users of rubber. There is therefore no likehood of an overproduction at least for the next 10 years. It is not so easy and cheap to start new plantations at present as it was 10 years ago. The dreadful diseases that have made their appearance in the East go to show that if production overtakes consumption it will be the late owners who will have to bear the brunt of the consequent fall in price. There is no excuse for planters who are in possession of tens of thousands of trees, 10 to 12 years old, and who have not started tapping them.

CHAPTER IX.

ESSENTIAL OILS.

	1915		1916		1917		1918	
	Quantity in litres	Declared value	Quantity in litres	Declared value	Quantity in litres	Declared value	Quantity in litres	Declared value
		Rs		Rs		Rs		Rs c.
Cinnamon bark oil	99	1,099	1,834	15,609	91	2,562	131	3,930.—
„ leaf oil...	9,587	37,572	15,669	67,256	14,175	64,753	12,731	76,671.50
Clove leaf oil ...	465	3,325	2,147	10,557	707	4,005	1,082	5,907.—
Lemon grass oil ...	77	308	6	24	148	1,061	75	900.—
Bigarade leaf oil...	...	...	12	688	...	...	27	162.—
Vetiver oil ...	...	...	31	666	...	...	31	310.50
	10,228	42,304	19,699	94,800	15,121	72,381	14,077	87,881.—

In spite of the utmost shipping difficulties, this industry has developed steadily and has been taken up by small holders who followed the example of a Chinaman and started building small wooden and iron stills out of materials obtained locally. The best distilleries are those in which steam distillation is used and it is probable that in the long run it is much more economical to put up modern machinery. But the price of cinnamon leaf oil rose so much during the year (it reached 1s per oz. in London in August 1916, instead of 4d as formerly) that it was rightly considered beneficial to take advantage of that inflation of price by putting up machinery of only a few years duration. It was impossible during the war to get proper machinery from Europe. Samples from various distilleries were sent to the Imperial Institute for examination and it is hoped that it will be soon settled whether there is much difference in value and analysis between the oil obtained by steam distillation and that obtained in rudimentary wooden stills. Even if the value of the oil is lower in these latter stills, the price is so high at present that the margin of profit is wide enough to make good the deficiency of the inferior article. The praiseworthy initiative of the planters who decided to erect distilleries with the scanty means and material at their disposal is the first step in Seychelles towards starting home industries which are so much adapted to this colony with its unemployed inhabitants and its great distance from centres of information. This is the first step in the right direction for many years and it will go far to allow many planters to bridge over the difficulties which have arisen from the destruction of their vanilla plantations by disease consequent on the culture of the same plant in the same soil for more than 50 years without rotation of crops. Since writing the above the report from the Imperial Institute has been received (August 1918) and there is not much difference between oil obtained by steam distillation and that from rudimentary stills obtained by direct fire distillation.

CHAPTER X.

FISHERIES.

The exports from the outlying islands amounted to:—

Salt fish	ks 21,895	value at	Rs 4,950	Tortoise shell	ks 215,500	valued at	Rs 6,265
Calipee	679	„	2,037	Green turtle shell	nil		
Trepang	nil			Guano	tons 2,470	„	99,100
Shark fins	„			Whale oil	nil		

The produce of the fisheries of this Colony is dependent on the working of the guano deposits, all the above articles being produced in spare time by the guano labourers. As guano exportation has practically stopped from want of freight the subsidiary industries have been held up in their turn. When one thinks that the submerged coral banks and atolls in the Seychelles archipelago extend over more than 20,000 square miles while the land area is less than 100 square miles, one can only deprecate that the fisheries of the Colony do not occupy a larger place among the local industries.

The chief reason for which those industries are not more developed are want of capital and lack of knowledge. A bureau of fisheries under a marine biologist should be started in Seychelles similar to the department which is doing so much good work in South India under Mr Hornell. This latter expert has kindly identified for me during the year the following edible molluscs :—

Chicorée.—Murex ramosus, Linnoeus.—This is the elephant chank of Ceylon.

Burgo.—Turbo marmoratus, Linnoeus.—This is the green nail of commerce from which cheap pearl buttons of fairly large diameter are made. It is worth about Rs 40 a 100 lbs.

Hache d'arme.—This is a species of Pinna which is very common in many localities such as Long Island (Mahé), Grand Anse (Praslin) &c. Its rate of growth is very quick. It is mostly used here as bait in fishing baskets. The abductor muscles if sundried would find a ready sale on the Chinese market.

Madame César.—A species of Strombus used here as food.

Bigorneau.—This mollusc is a Nerita possibly N. Rumphii, Reclus.

Bernicle.—This is a species of Patalla occuring abundantly almost all over the archipelago on rock in shallow water. It is the well known limpet of the English Coast which is so greatly esteemed. Not enough use is made of this tasty and nutritious food in Seychelles.

Chicorée rouge.—Fascillaria trapezium Lin.—Is large enough to be a valuable food product. Its shell is of value only as a source of lime.

Madame Jean Pierre.—A species of monodonta. Mr Hornell informs me that it is very like one of the Littorinas (Periwinkles) which are of great importance in England and elsewhere where they are sold wholesale by sackful.

Tec-tec.—Mesodesma glabratum, Lam.—This small bivalve is very valuable as a minor food source.

In S. India the methods of fishing by nets, and fish curing have been considerably improved by Mr Hornell and his assistants, and as far back as 1911 when I visited S. India, the manufacture of fish oil, fish guano and fish soap was already receiving the attention of the department then under the charge of Sir F. Nicholson. Nothing would be more beneficial to the Agricultural development of Seychelles than fish oil and fish guano, the former to combat scale insects attacking nearly all cultivated plants and the latter to be used as manure for coconuts. The slow action of this manure and the impossibility of using in lieu of it more soluble subtances, such as sulphate of ammonia, nitrate of soda &c., which are rapidly leached out by rain from the sloping grounds, fully warrant the establishment of these industries in Seychelles, not to speak of the profit which would be derived from the fisheries themselves

Drift nets and cast nets are never used for fishing in Seychelles where off-shore lining is, generally speaking, the sole mode of fishing. These nets should be introduced from S. India together with a good model of motor boat with internal combustion engine which could be put under the charge of the youngsters of the fisher class who a re qualified as mechanics.

The Bêche de Mer industry has almost vanished from Seychelles. Methods of fishing and curing could be learnt from S. India where a Government station for curing this article also has been recently established. Mr Hornell informs me that Indian fishermen who practice at the same time chank fishing by diving have learnt from Chinese trepang curers a method of curing which has allowed the use of the white Bêche de Mer formerly abandoned owing to the presence of limy spicules in the skin of the animal. These spicules are got rid of by fermentation underground and subsequent peeling of the skin layer which contains the chalky deposit. The great difficulty in curing trepang properly is the necessity of complete evisceration, this animal ingesting sand together with the organisms on which they live (diatoms etc). If sand is left in the intestins the cured article greatly deteriorates. The pans in which the trepangs are boiled should be kept scrupulously clean at the end of each day's work as any boiled body juice left overnight is so corrosive that it destroys the pan in a short time and damages the copper receptacles besides rendering the latter dangerous owing to copper salts getting mixed with the cured article.

The problem of fish preserving is difficult in this colony where the mean temperature is 81° F. In S. India excellent results were obtained by soaking well cleaned fish for a few minutes in brine with a slight admixture of a boric preservative, especially if the fish is wrapped after soaking in parchment paper. These boric preservatives are absolutely innocuous, they are legally permissible in much larger quantities in butter, potted meats &c. They entirely prevent taint for 24 hours and keep fish free from the deadly ptomaines and toxins, a stage to which much of the fresh fish at present arrives within 12 hours.

There are many other sea organisms and seaweeds cast ashore which go to show the lines on which the fisheries and other allied industries could be developed. There is already at Curieuse Island a creek across which a wall has been built enclosing an area of about 40 acres where interesting experiments could be started. Seaweeds are piled up on the beaches twice a year in great quantity. At Grand'Anse, Praslin alone, one can reckon that several hundred tons could be made use of annually for transformation into potash and iodine salts One of the mosses is very common in creeks and occasionally eaten by the residents. This article of food should be manufactured on a greater scale and consumed by everybody, the worn out soils of the colony not providing enough vegetable food for the inhabitants who live mostly on fish.

CHAPTER XI.

INSECT NOTES.

The Rhinoceros beetle (Oryctes Rhinoceros) continues its depredation. Upon the recommendation of the Planters Association a Bill has been prepared by the Hon. The Legal Adviser towards the end of the year giving power to the Agricultural Department to eradicate the beetle from the plantations that are not properly looked after, at the expense of the owner. Provision is also made to combat the accumulation of rubbish in which the beetle breeds and also to tackle gradually with the other insect and fungus pests which the planters will accept to destroy. The Bill is framed on the lines of the Ceylon ordinances which are less drastic than those of Malaya. Plant sanitation is a dead letter in this colony and in many cases the trees are suffering primarily from lack of food, improper cultivation and want of drainage more than from insect and fungus pests which are consequent on agricultural mistakes. It is therefore advisable to adopt legislative measures more leniently than in countries where the methods of cultivation are more advanced.

A notable feature in the low country at Mahé is the gradual disappearance of the small black ant (Technomyrmex albipes) which for exactly 10 years has been such a dreadful household pest. This insect is also the commensal of a large number of scale insects which they protect from their natural parasites by accumalating all sort of vegetable debris under which the coccids continue to breed. Fortunately an insect parasite (Cephalosporium lecanii) introduced from Ceylon in 1911 escaped the vigilance of the ants and most of the worse scale insects (Lecanium viride), L. tessellatum, Ceroplastes rubens, &c. were destroyed by the fungus year by year and the consequence is that the ants which feed on the excreta of the scale insects find less food at their disposal as time goes on and perish in considerable numbers. It is astonishing to see how the beneficial fungus got spread all over the colony in a short time. This fungus is dependent on the rainfall and the spores are more actively disseminated during the rainy season. It is proposed to introduce from S. India another grey fungus (Empusa lecanii) which destroy the green scales even during cold weather. By means of these two natural parasites it is hoped that the scale insects attacking lime, coffee and other fruit trees together with their commensal the ants, will no longer levy a tax on fruit production which exceeded all that could possibly be imagined. Already many fruit trees, oranges, limes, breadfruit, avocado pear, mangoes, guavas &c. bear at present more fruits than during the last 10 years. Many breadfruit trees which had remained fruitless during a long time have been seen producing fruits this year of an extraordinary large size. (10 inches long). This is due no doubt to the trees, having remained dormant a long time, so accumulating more energy, produced larger fruits when they were suddenly relieved from the attack of scale insects. The time is come for the treatment by spraying of the fewer scale insects that still remain in sufficient number to cause a new outbreak of disease if dry weather prevails again a long time. Ants other than Technomyrmex are already seen driving out the latter from the

fields in which they were masters by sheer weight of numbers for the last 10 years. In the Praslin group which became infested with scale insects and ants later than 1910, the natural fungus parasites although present, have not done their work and the plantations in these dependencies are undergoing the havoc which was witnessed in Mahé 2 or 3 years ago. The climate of this group islands being drier than in Mahé, the work of the fungus parasite may be handicapped but the new grey parasite from S. India will be tried in these localities. There are other parts of Mahé on the hills which suffered less than the low country for the last 5 years but there the ants seem to be at present swarming in search of food more than formerly.

Among the insects identified during the year (by the Imperial Bureau of Entomology) the following are mentioned :—

1. Argyroploce aprobola Meyr. This lepidopteron lays its eggs on the leaves of Ambrette (Hibicus abelmoschus) and goes far to prevent the culture of this plant except in places where the soil is so rich that the growth of the plant overpowers the development of the insect. As these plants are scare, the caterpillars should be destroyed by spraying with lead arsenate. Very satisfactory results were obtained with Arsenate of lead paste obtained from Messrs William Cooper and Nephews. Spraying every fortnight keeps the plant entirely free from the caterpillars. As this insecticide cost only little over 1*s* a lb in London and that no crop of ambrette is obtained without it in poor soil the attention of planters has been called to such a valuable mixture.

2. Acrocercops angelica Meyr. Sp. nor—This minute lepidopteron of the Gracilaridae family, was found during the year attacking leaves of many plants in the Praslin group espe- Callophyllum inophyllum (Takamaka) and Sideroxylon attenuatum (Bois mon Père). As many as 50 eggs are deposited on the epidermis of one single leaf and the caterpillars eat up the parenchyma under cover of the cuticle with the result that each caterpillar before pupation eats and destroys a piece of leaf as large as a shilling. One can fancy what becomes of the leaf when there are 50 caterpillars at work at the same time. I have seen trees 5 feet girth losing all their leaves and become stag-headed in a couple of months. This insect which is indigenous is giving much trouble at Félicité Island. Towards the end of the year its number was found to have been reduced considerably after the advent of the wet weather.

Macrotoma wrightii.—A large cerambycid beetle of which a female specimen, new to the British Museum, was secured during the year from a cedar tree at Praslin. The grubs of this beetle are enormous, being 4 inches long and are said to be relished by Chinamen. The insect has not developed to such an extent as to become a pest.

4. Stromatium barbatum F. Another beetle of the same family has been found attacking furniture in Mahé. The grubs bore into all sorts of wood including rose wood (palissandre) teak &c., and the adult emerges leaving a large hole which spoils the pieces of furniture for ever.

5. Among Coccidae.

a. Aspidiotus trilobiformis on Passiflora fœtida (Mahé) and Anacardium occidentalle, Praslin.

b. Pulvinaria antigoni and Asterolecanium pustulans var Seychellarum on lantana (Mahé).

c. Pinnaspsis buxi-Bouche.

d. Pinnaspis buxi var alba. Ckll.

e. Poliaspis sp. Comst.—These three last mentioned insects attack leaves of Areca nuts palm (Mahé).

f. Ceroplastes rubens Mask on Acrostichum aureum Praslin.

CHAPTER XII.

CROWN LAND.

The following list of Crown Lands is recorded.

1. In Mahé :

Capucin Nos. 6, 7 and 8. These plots of land are about 50 acres each. No. 8 is leased Rs 100 a year to Mr L. E. Lanier who plants vanilla and robusta coffee on a small scale and who barks all cinnamon trees. Nos. 6 and 7 are unleased but Mrs Lagrange has acquired under yearly agreement the right of barking a portion of the cinnamon trees and of cropping the leaves of the same plant. In 1918 the amount of bark sold at Rs 3 per 100 kilogs = Rs 384.93 and the amount of leaves sold at Rs 3 per ton = Rs 324.03. By agreement renewed in 1919 the price of leaves has been increased to Rs 5 25. These Crown lands stretched up from about 700 feet elevation to the highest summits. In No. 6 there are a thousand takamaka and bois de table trees planted in 1884 which have reached about one foot in diameter.

Morne Blanc. This estate of about 70 acres was seized by Government in 1912, the owners having failed to repay a loan of Rs 6000. It is a vanilla estate opened up about 35 years ago and is at present quite worn out as far as the growing of this orchid is concerned. Several small plantations of coffee robusta, palm oil and vanilla are being set up by Government. The leaves of the small cinnamon trees which were left by the late owner are being sold under agreement to a neighbouring proprietor who cropped only kgs 7,287 sold at Rs 3 per ton = Rs 21.86 during 1918.

Delanos and Lavoquer; Labat; Pilot; about 400 not yet surveyed. Hoboul Crown land 79 acres, Sauvage Crown land 37 acres, Colomès Crown Land 250acres, Perard Crown land 294 acres form one block of land on both sides of the central ridge extending from Morne Blanc in the South to Niol road in the north. This block of land was acquired by Government in 1910, mostly by exchange, in order to keep wooded the central mountain where most of the rivers of Central and W. Mahé take their rise. Portions of these summits are being opened up with

a view of eradicating the bracken fern which hampers the growth of indigenous trees by natural regeneration and of reafforesting with trees from Ceylon, W. Indies, Phillipines, Mauritius and Java. Delanos is being planted with endemic trees such as Capucin, bois maret, bois de fer, Gayac which are almost extinct; Perard is devoted to fruit trees of which there are more than 50 varieties already set out. Hodoul and Sauvage are close to the reservoir from which the main supply of Victoria is obtained. Colomès and most of other Crown lands which were abandoned, and worn out estates are being gradually reafforested.

The following plants were set out during the year:—

Copal. Trachylobium verucosum ...	1,125	Luccœna glauca	543
Albizzia moluccana	141	Callophyllum inophyllum	539
Parkia roxburghii	425	Heritiera littoralis	1,131
Gliricidia maculata	400	Various indigenous palms	542
Areca catechu	388	Casuarina equisetifolia	375
Tecoma leucoxylon	1,185	Pterocarpus indicus	82
Coffee robusta	311	Various mangoes	56
Cola accuminata	230		

Among fruit trees at Perard the following were added to the list:—

Blighia sapida 1 plant from Madagascar.

Eugenia Pakeri 3 plants from Java.

Oranges 39 selected from local strains.

The small holders who were allowed to plant ground provisions free of rent on terrain Sauvage & Hodoul on the Niol road accepted to set out 1051 plants inside their plantations. The trees planted were mostly gum copal, Parkia, Takamaka, Coco plum and Tecoma leucoxylon.

Terrain Dugand. 13 acres. This Crown land near Government House was acquired in 1913. It is now leased to an Indian planter at Rs 30 a year who grows ground provisions and vegetables. The land is also set out with palm oil, mangoes, oranges and Algaroba which are looked after by the lessee.

Planeau and Bardeau about 190 acres. These two Crown lands occupies the central ridge beyond Misère gap and have been leased in 1910 by Mr d'Emmerez de Charmoy a neighbour who contested Government rights of ownership. The leave expires in 1943.

Cascade Crown land. This was sold to Mr d'Emmerez de Charmoy in 1917 for Rs 3000. It was a strip of land extending from Cascade village right up to Misère of not much use to Government.

Long Island. About 40 acres. This is the Quarantine Station. The island is planted all over with cocoanuts which produce about 19,000 nuts per annum. The island was cleared of brushwood during the year and ground provisions set out between the palms.

The following other Crown lands of Mahé are small pieces of land of no value save those in Victoria which are leased as sites for quay, wharfs &c. The rent of these Crown lands amount to Rs 1680.

1. Public Works yard.
2. King's College.
3. Carnegie Library.
4. Court yard.
5. Botanic Station ground, 12 ½ acres.
6. Plaisance camp.
7. Comblage, Albert Street.
8. Gordon Square.
9. Admiralty wharf leased at Rs 600 per annum.
10. Wharf leased to Mr d'Emmerez de Charmoy Rs 500 per annum.
11. „ „ „ Ally Rassool „ „ „
12. „ „ „ Messrs Baty Bergne & Co's, Rs 20 per annum.
13. Seychelles Club leased at Rs 60 per annum.
14. Anse la Mouche leased to S. Benoit at Rs 12 per annum.
15. Pointe au Sel „ D. Stephenson „ 1 „
16. St Louis „ T. Valsin „ 12 „
17. Anse Royale „ J. St Jorre „ 60 „

2. In the Praslin group the Crown lands consist of:—

1. Félicité Island which is a large property of 690 acres planted all over with coconuts except within a forest reserve of 149 acres properly delimited. This forest is the best in the colony but being adjacent to a newly cleared area of more than 80 acres, the forest trees suffer from the ravages of a small moth which attacks the leaves of Takamaka and from dry rot which found on the off-fall of the felled trees of the neighbourhood a proper medium for its development. This island is leased at the rate of Rs 4000 until 1926 when the rent will be increased to Rs 10,000 per annum for a period of 15 years.

Curieuse Island. Leased to Mr Chenard at Rs 2000 a year. Expiry of lease in 1940. This island is over 900 acres in extent but before it became Government property it was deforested and planted in ground provisions to such an extent that the soil has been washed down to the plateaux on the beach and alongside a few valleys where coconut palms have been planted. There are about only 125 acres of cultivable land, the rest is a poor laterite which exhibits its desolate aspect at a considerable distance. The island produces 18,000 coconuts a month.

Fond Boffay. Leased to Mr d'Emmerez de Charmoy at Rs 200 per annum. Lease expires in 1931. By agreement with Government in 1911 Mr d'Emmerez consented to plant about 5000 Para rubber trees within 5 years. These trees are at present growing well and it is a pity that the whole land covering 166 acres is not transtormed into a rubber estate. The soil is uncommonly good all over and besides rubber, coconuts, sisal, and coffee have been found to do very well in that locality which is 10 minutes walk from Baie Ste Anne.

Anse Marie Louise. 61 acres. This is a beautiful piece of land which was acquired by Government as far back as 1893 for the protection of the coco-de-mer palms which were then being destroyed all over the island. Only part of it is forest land where the beautiful palms grow. The rest consists of a plateau, a marsh and a few hillocks which have been opened up by several lessees. Even the coco-de-mer valley itself has been partially cleared of the trees and undergrowth and turned into a banana plantation. The land is leased Rs 700 a year and as only 800 coco-de-mer nuts worth Rs 400 are collected annually. Intensive cultivation is carried on and shifted to various places in order to make good the shortage of produce. This practice is much to be deplored as not only the coco de mer palms should be left in their natural state in the jungle where they get shelter from wind and drought in the young age but also because clearing by fire in such a place may cause the accidental destruction of the whole valley at any time. The present lessee is Mrs Collie ; the lease expires in 1922 but is renewable by mutual consent.

Fond Ferdinand, 70 acres. This Crown land is also a portion of the famous coco-de-mer forest purchased by order of the Secretary of State in 1895. It consists of several valleys where the coco-de-mer palms grow to perfection and several inferior hilly portions of land which surround these valleys on all sides. In spite of the utmost precaution against planting these valleys in ground crops and vanilla, the state of wilderness in which they were kept formerly gradually disappears to the great prejudice of the scenery. I think that portions of two Crown lands should never be leased for the proper protection of the coco-de-mer palms.

Fond Azor and Le Vague, 131 acres. These two Crown lands near Baie Ste Anne were opened up by portions of 30 acres and leased to small holders in 1909. It was thought that the poorer inhabitants of Praslin would in that way get a chance of having a little piece of land of their own for planting ground provisions, vanilla and coconuts. Although about 300 coconut palms were set out by these small holders, the scheme was not a success owing to the poor quality of the soil and the failure of vanilla which prevented them from getting an annual crop. Only 2 small holders out of 7 have renewed their lease after the first term of 9 years.

Round Island. 43 arpents. This island which was exchanged in 1899 by one Mr Aimé Jumeau for a piece of Crown land at La Digue is a beautiful Crown land at the entrance of Baie Ste Anne. It is the present residence of paupers and lepers under charge of the A.M. Officer of the Praslin group. The island produce enough coconuts for a free and generous distribution of nuts to all lepers, paupers and labourers besides a reserve of about 12,000 nuts a year which are sold by auction.

Anse Kerland and Anse Georgette, 59 acres. These two Crown pieces of land of about 60 acres are leased to a neighbouring proprietor Mr Emile Adam for Rs 80 a year. The lease expires in 1930. Mr Adam took over these two Crown lands in 1899 and has set out over 1000 coconut palms and 2500 cedar trees on all suitable plots that were available. The rest of these two properties consist of worn out hill sides where a few coco-de-mer trees still survive.

Savoie, 69 acres. Leased to Mr Abel Adam for Rs 70 a year. Lease expires in 1924. This crown land is a typical worn out Praslin estate with top soil only near the beach and alongside a few valleys where coconuts and vanilla are grown on a small scale. The rest is a series of hillocks full of reeds were hardy trees such as Bois Rouge, Bois mon Père, Cashew nut trees &c. alone can thrive.

Newcome, 73 acres. Leased to Mr François Houareau for Rs 60 a year. Lease expires in 1930. This Crown land is even worse than the preceding one. Formerly it was set out in vanilla but the orchid after several years of successful cultivations seems at present unable to make any growth. Coconuts supplied from Round Island are being gradually planted.

Pointe Chevalier, 75 acres. Leased to Mr d'Emmerez de Charmoy for Rs 50 per annum for the first ten years, 75 rupees per annum for the second ten years. Lease expires in 1936. This Crown land opposite Curieuse hardly allows the lessee to pay the rent. The leases is allowed to clear acre by acre provided coconut palms are planted in the new clearings. Work is going on very slowly.

Pointe Zanguille, 44 acres. A rocky promontory between Curieuse Bay and Anse Vaulbert, leased to Mr Bessin for Rs 60 a year. Lease expires in 1931. Only those portions which are suitable for planting coconuts are cleared one after another. The lessee gets the firewood without giving a share to Government; 300 coconuts have been set out during the last 3 years. Vanilla does no longer well on that Crown land owing to exhaustion of the soil in food elements.

Terrain Merante leased to Mr William Germain for Rs 10 a year. Lease expires in 1919.

Among the outlying islands the following belong to the Crown :

In the Amirantes, Marie Louise about 150 acres, Remire about 50 acres, African Banks 4 acres, Des Neufs 70 acres, Boudeuse 20 acres are all leased to the Mahé syndicate for Rs 250 a year. The lease expires in 1940.

In the Aldabra group, Aldabra proper about 40,000 acres, Cosmoledo about 2000 acres, Assumption 2,700 acres are leased to Messrs Biggerstaff for Rs 3,000 to Rs 6,000 a year Lease expires in 1931.

Astove about 2,000 acres is leased at Rs 500 from 1.9.17 to 30.8.31 and from 1.9.31 to 30.8.61 at Rs 1,500 per annum to Mr d'Emmerez de Charmoy. Lease expires in 1961.

In the Providence group, St Pierre has 400 acres is leased to the Mahé Syndicate for Rs 750 a year.

P. R. DUPONT,
Curator Botanic Station.

28th March, 1919.